

## REMARKS

This is a further preliminary amendment to the earlier preliminary amendment filed on May 26, 2005. The instant application claims priority to PCT App. Serial No. US2003/037963, filed on November 26, 2003 (the “‘963 application”), which is a continuation in-part of and claims priority to U.S. Pat. App. Serial No. 10/306,614, filed on November 26, 2002 (the “‘614 application”).

Claim 14 has been amended and new claims 22-35 have been added. Claims 14, 16, 17 and 23-39 are pending. Support for the amended and new claims can be found throughout the originally filed applications.

Support for amended independent claim 14 is inherent in the ‘614 application at pages 32-35. It is well-established that an inherent feature or advantage need not be expressly disclosed in an originally filed application:

By disclosing in a patent application a device that inherently performs a function or has a property, operates according to a theory or has an advantage, a patent application necessarily discloses that function, theory or advantage, even though it says nothing explicit concerning it. The application may be amended to recite the function, theory or advantage without introducing prohibited new matter.

M.P.E.P. § 2163.07(a) (citations omitted.) By following the steps for nanoparticle synthesis set forth at page 33, ll 5-17 and page 35, ll 15-29 of the ‘614 application, the fluorescent nanoparticle of claims 14 and 15 are necessarily generated. In particular, incorporation of the organic silane 3-mercaptopropyltriethoxysilane and maleimide into the synthesis generates extremely small fluorescent silica nanoparticles, on the order of

between about 4.0 nanometers and greater.<sup>1</sup> While not wishing to be bound by theory, Applicants believe the reason for the small size of these nanoparticles is the presence of mercaptopropyltrialkoxysilane, which leads to the formation of water-insoluble polymeric or oligomeric chains that are relatively quickly co-condensed, thereby allowing less time for the particles to increase in size.

Similarly, support for the structural formula recited by dependent claim 27 is inherent in the '614 application. The reaction mechanism for generating silica nanoparticles in accordance with the exemplary embodiments at pages 32-35 yields nanoparticles with this formula.

Support for new independent claim 26 can be found throughout the '614 application at, for example, page 6, ll 17-19, page 34, ll 16-18 and page 37, Table 1. In each instance, various measurements for nanoparticle diameters are provided. Dependent claim 28 relies on the same support.

Support for new independent claim 34 can be found in the '614 application at page 9, ll 22-29. The various diameter measurements for both core and shell are expressly set forth therein. This is also the case for new dependent claims 29 and 35.

Support for the incorporation of various other compounds into the silica nanoparticles is also found in the '614 application. With respect to dependent claims 17, 32 and 37, support for the limitation reciting a "ligand positioned on an external surface of the fluorescent nanoparticle" can be found in the '614 application at page 10, ll 14-25. With respect to dependent claim 18, 33 and 38 support for the limitation reciting a "mercapto group" can be found at page 33, ll 5-17 and page 35, ll 15-29 of the '614

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<sup>1</sup> In addition, the '963 application, at page 12, ll 10-17, teaches the formation of core silica nanoparticles comprising radii of 2.2 and 2.9, which equate to diameters of 4.4 and 5.8.

application, which rely on a reaction including mercaptopropyltrialkoxysilane. With respect to dependent claim 31 and 36, tetramethylrhodamine-5-(and-6-)-isothiocyanate is an organic dye covalently conjugated to the core after synthesis in accordance with the steps set forth at page 33, ll 5-25.


The '614 application also supports various numerical limitations. With respect to dependent claim 24, support for the ratio limitation can be found in the '614 application at page 9, ll 17-19, which states "[t]he thickness or diameter of the core to the thickness of the silica shell can be in a ratio of, for example, from about 1:1 to about 1:100. With respect to dependent claims 25 and 30, the '614 application, at page 34, ll 29-30, states that interaction effects between the core and shell may be responsible for enhanced quantum efficiency, which is necessarily at least about 20% greater than that of free dye in aqueous solution.

### CONCLUSION

Given the foregoing amendments, Applicants respectfully submit that the application is now in condition for allowance. Favorable action is earnestly solicited.

Respectfully submitted,

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